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10/085,279	02/27/2002	Steven Luo	P98036US4A	3837

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EXAMINER

TESKIN, FRED M

ART UNIT PAPER NUMBER

1713

DATE MAILED: 03/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

10/085,279

Applicant(s)

LUO, STEVEN

Examiner

TESKIN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-46 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21-46 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 061302.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

The preliminary amendment of February 27, 2002 has been entered in full.

Claims 21-46 are currently pending and under examination.

The disclosure is objected to because of the following informalities: continuity data added per the aforementioned preliminary amendment should be consolidated with the "Prior Patent Information" appearing at page 1, lines 5-6 of the specification as filed, and updated to include the present status of the immediate parent application and the filing dates of the '305, '956 and '861 applications.

Claims 27, 38 and 41-46 are rejected under 35 U.S.C. 112, first paragraph, as the specification does not contain a written description of the claimed invention, in that the disclosure does not reasonably convey to one skilled in the relevant art that the inventor(s) had possession of the claimed invention at the time the application was filed.

With respect to claim 27, the entire subject matter of the phrase "n is an integer including 1, 2 or 3," does not find adequate descriptive support in the specification as filed. Indeed that phrase, by reason of the open "including" language, renders claim 27 readable on integers other than those listed; e.g., $n = 0$ in the recited formula, whereas the corresponding formula disclosed in the original specification positively defines "n" as "an integer from 1 to 3" (see page 12, lines 9-11). No other portion of the specification ascribes a broader definition to "n"; hence claim 27 literally reads on subject matter outside the scope of the written description of the invention, in violation of 35 U.S.C. 112, first paragraph.

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With respect to claims 38 and 41-46, the subject matter of the phrase "molar ratio of ... (Al/Fe) is 12:1 or greater" (see claim 38, lines 9-10) opens said claims to virtually any Al/Fe ratio in excess of 12 that does not preclude preparation of syndiotactic-1,2-polybutadiene according to the claimed process. This would include molar ratios beyond the upper endpoint of the range disclosed in the original specification, i.e., "about 100:1" (see page 16, lines 1-3 and 17-18). The specification is nowhere seen to describe, expressly or implicitly, the use of Al/Fe molar ratios greater than about 100:1 for preparing any type of conjugated diene polymer, let alone the specific species being prepared according to claim 38. Thus the specification fails to convey to one skilled in the relevant art that applicants had possession of the claimed invention, including those embodiments employing Al/Fe molar ratios greater than about 100:1, at the time the application was filed.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 3419505 to Marsico, alone or with reference to US 4168357 to Throckmorton et al.

The rejected claims are drawn to a process for preparing conjugated diene polymer, comprising the step of polymerizing monomer consisting essentially of

conjugated diene monomer in the presence of a catalyst composition that is formed by combining:

(a) an iron-containing compound;

(b) a hydrogen phosphite; and

(c) an organoaluminum compound, where the catalyst composition includes from about 0.01 to about 1.0 mmol of the iron-containing compound per 100 grams of monomer, and where said combining step occurs in the presence of at least one type of conjugated diene monomer.

Marsico discloses a process for preparing high molecular weight homopolymers and interpolymers of monomers including conjugated dienes, wherein the monomer is polymerized in the presence of a homogeneous iron coordination catalyst which is the admixture product of an iron (III) compound, an aluminum alkyl and various dialkyl hydrogen phosphates. In column 5, lines 28+, specific species of dialkyl hydrogen phosphite are mentioned, including dimethyl hydrogen phosphite, dioctyl hydrogen phosphite and didodecyl hydrogen phosphite; and in Examples IV-VI and XIV, di(2-ethylhexyl) hydrogen phosphite is used together with the requisite iron-containing and organoaluminum compounds to catalyze the interpolymerization of 1,3-butadiene. As these same species are listed as representative examples of applicant's acyclic hydrogen phosphite (cf. specification, page 9, lines 24+), they are considered to qualify as a "hydrogen phosphite" within claim 21.

Further in this latter regard, Throckmorton et al is alternatively relied upon merely to document the fact that the aforementioned species of dialkyl hydrogen phosphite explicitly

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disclosed by Marsico do indeed possess acyclic tautomeric structures as depicted in claim 26 (see Throckmorton at the bottom of column 2 and at column 3, lines 8-15).

The differences between Marsico and the claimed subject matter are essentially twofold: Marsico (1) includes a slightly higher amount of iron-containing compound in his exemplified catalyst compositions than permitted by claim 21 and (2) combines his catalyst components in the absence of a conjugated diene monomer.

As to (1), examiner views Marsico's generic teaching as suggestive of the efficacy of his iron coordination composition at lower concentrations vis-à-vis similar coordination catalysts of the prior art. See in particular column 2, lines 2-24, where Marsico notes the unexpectedly superior catalytic activity of the iron coordination compounds of his invention, compared to similar prior art catalysts, citing to Examples XV and XVI. According to applicant, Examples XV and XVI employ 1.25 mmol of ferric acetyl acetate per 100 grams of 1,3-butadiene monomer, while Example XVII employs 1.13 mmol of iron-containing compound per 100 grams of monomer. (Response of August 31, 2001 in parent application no. 09/475,343, footnotes 1 and 2.)

Marsico's teaching of superior catalytic activity implies a lower concentration of his iron coordination composition may be suitably employed to achieve polymer yields comparable to, if not higher than those achieved with higher loadings of prior art coordination catalysts. And, given the self-evident economic benefits associated with a lower catalyst loading, ample incentive exists for an ordinarily skilled practitioner to seek to minimize the amount of catalyst components used in the process of Marsico.

Accordingly, examiner finds that modification of the conjugated diene polymerization process of Marsico by reducing the concentration of the iron-containing compound therein to an amount equal to or slightly below "1.0 mmol" per 100 grams of monomer as per claim 21, or an amount within the scope of "about 0.5 mmol" as per claims 33-34, would have been obvious to one having ordinary skill in the art at the time of applicant's invention.

As to difference (2), examiner notes Marsico's teaching of the alternativeness of forming his catalyst composition *in-situ* in a polymerization system, "in which case the **unreacted monomer** or liquid polymer may serve as a solvent" (col. 6, lines 59-62; emphasis added). This teaching would have suggested and rendered obvious to one of ordinary skill preparation of the catalyst composition of Marsico in the presence of conjugated diene monomer(s), as claimed.

Examiner further notes, concerning the "consisting essentially of" language used in claim 21, that it is applicant's burden to show that the introduction of additional components, such as the alkylene oxide comonomer of Marsico, would materially change the characteristics of the claimed invention (see MPEP 2111.03). Presently, there is no basis in this record for concluding that any of Marsico's comonomers would so alter the characteristics of the instantly claimed invention as to be excluded from the scope of the claims by such transitional language.

In any event, Marsico generally teaches the utility of his catalyst compositions in obtaining "unexpectedly rapid and highly selective production of high molecular weight homopolymers and interpolymers as described below." (Column 2, lines 2-6.)

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Homopolymerizable monomers "described below" include numerous species of aliphatic conjugated dienes; e.g., 1,3-butadiene, isoprene, etc (Id., lines 53+). Thus Marsico would have taught one of ordinary skill in the art of the utility of the disclosed catalyst compositions in homopolymerizing a conjugated diene monomer that "consists of 1,3-butadiene monomer", as per claim 35.

The limitations of claims 22-25, 27 and 28 are either disclosed by Marsico or obvious from the teachings thereof. In particular, as to claims 22-25, Marsico generically teaches molar ratios ranges (iron to aluminum and iron to phosphorus) which substantially overlap the claimed ranges for the corresponding components (see col. 6, lines 31+); e.g., the disclosed range of from about 1:0.1 to about 1:25 for iron to aluminum equates to a range of about 10:1 to about 0.04:1 for Al/Fe, which substantially overlaps the ranges specified in claims 22 and 25 (about 1:1 to about 100:1). Claims 27 and 28 encompass the hydrocarbyl(oxy) and hydride compounds of aluminum taught by Marsico (col. 4, lines 60+).

As to claims 29-32, 36 and 37, each of these claims calls for the catalyst composition to be formed by combining the individual catalyst components in a specified sequence. The recited sequences, while undisclosed by Marsico, are not limitations of the polymerization process being claimed, but of the manner of making the catalyst used in the process. There is no evidence of record establishing that combining the catalyst components according to any of these claims distinguishes the final composition in any unobvious respect over the catalyst composition of Marsico containing the same three components (iron (III) compound, organoaluminum

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compound and hydrogen phosphite). Moreover, since Marsico states that the order of addition of catalyst components is not critical (col. 6, lines 44-45), it would have been obvious to one of ordinary skill in the art to vary the order of combining the components and reasonably expect to obtain compositions displaying equivalent catalytic properties.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 21-37 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of U.S. Patent No. 6,399,732. Although the conflicting claims are not identical, they are not patentably distinct from each other because they differ merely in matters of scope. Thus the "hydrogen phosphite" used as catalyst component (b) in applicant's claimed process for preparing conjugated diene polymers is defined by applicant to include cyclic hydrogen phosphates, which are in fact claimed in claim 26 hereof. The claims of the '732 patent are to the same basic process wherein "a cyclic hydrogen phosphite" or "a hydrogen phosphite" is included in an otherwise identical catalyst composition. See patent claims

1 and 17. The limitations of applicant's invention directed to concentration of iron-containing compound, order of combining catalyst components and requisite presence of a conjugated diene monomer(s) during the combining step are likewise features of the patented process, as per claims 4-6, 8-11, 18-26 and 28 of the '732 patent.

Claims 38-46 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 12-25 of U.S. Patent No. 6,180,734. Although the conflicting claims are not identical, they are not patentably distinct from each other because they differ merely in matters of scope. In particular, the difference in scope relates to the "combining" step of the instantly claimed process being carried out in the presence of a conjugated diene monomer(s); whereas the patented claims, while not specifying the catalyst composition be so formed, are nonetheless generic to combining the same three catalyst components in the presence of the same type of monomer. However, as noted above, formation of the catalyst composition in this manner has not been demonstrated to provide any unexpected result or surprising property over the corresponding catalyst composition, prepared in the absence of a conjugated diene monomer. Consequently, the present claim limitation on method of making the catalyst composition cannot be seen as a patentable distinction over the otherwise identical process as claimed in the '734 patent.

Claims 38-46 are free of the prior art of record. Examiner has not, as of the date of this Office action, located or identified any prior art document(s) that can be used to

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render the process defined by said claims anticipated or obvious to a person of ordinary skill in the art.

Any inquiry concerning this communication should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Thursday from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMTeskin/02-25-04


FRED TESKIN
PRIMARY EXAMINER
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